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THE PROCESS OF PASTORAL AND AGRICULTURAL SETTLEMENT ON THE ARGENTINE HUMID PAMPA*

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The process of pastoral and agricultural settlement on the Argentine Humid Pampa has created a sharply defined region where no such region existed before, and has introduced diversity into a scene which, under natural conditions, was probably notable for its monotony. The study of this region illustrates two generalizations important in the field of regional geography: first, that man rather than nature determines the habitability or productivity of areas; and second, that the specific physical qualities which are critical in an interpretation of the relation of the settlement to the land are determined by the objectives, attitudes, and technical skills of the settlers rather than by any inherent quality in the land itself. In fact, even the concept "humid" which distinguishes this eastern part of the Argentine plains from the drier western part has, perhaps unconsciously, been defined in terms of the necessities of modern commercial grain farming.

Only a boundless monotony of billowing grasses greeted the Spanish colonists on the south bank of the Paraná-Plata River. Yet it is not improbable that the landscape had already at that time suffered an important modification of its natural condition. Schmieder arrives at the conclusion that the prairie had replaced the original scrub-forest cover as a result of fires lighted by the Indians.[1] To the west the land was covered with so-called *monte,* composed of deciduous broadleaf scrub trees and bushes. Even in the midst of the monte there were many grassy openings, and in the monte-prairie transition grass and scattered trees were mixed.[2]

* Reproduced by courtesy of Odyssey Press, from a forthcoming book, "Latin America: A Human Geography."

[1] O. Schmieder, "The Pampa—a Natural or Culturally Induced Grass-Land?" *Univ. of Calif. Publ. in Geog.,* Vol. 2, 1927: 255-270.

[2] F. Kühn, "Der Steppencharakter der Argentinischen Pampa," Pet. Mitt., Vol. 75, 1929: 57-62.

But the trees could not survive the fires, and little by little the margin between monte and prairie was sharpened, and when the Spaniards established themselves for the first time at the site of Buenos Aires (1536), only vast monotonous stretches of grass greeted them.

Today the Humid Pampa is anything but monotonous, excepting in terms of its surface. Pastoral and agricultural settlement has revealed a variety of differences in drainage and soils (Fig. 1) and in other physical qualities of the area, such as the dependability of rainfall.[3] For a non-agricultural people, like the Spaniards, with scrubby, half-wild cattle, the latent contrasts within the area which have been made prominent in terms of alfalfa, wheat, and maize could scarcely have been noticed. Even the tall bunch grasses of the prairie—the *pasto duro*—could not have seemed radically different from the grassy, tree-covered monte-prairie transition, or even from the monte of the territory west of Santa Fé. The animals did about as well on the grassy openings of the monte, as on the prairie. If the Humid Pampa today is one of the world's chief food-producing areas, it has become so because the changing techniques of agriculture and the changing economic conditions made this more recent phase of its transformation possible.[4]

The Agricultural Divisions of the Humid Pampa

The present agricultural divisions of the Humid Pampa (Fig. 2) are the result of an historical succession of forms of land use. Five different kinds of land use have been applied to the region; but each of the five has been adjusted somewhat differently to the physical background of the climate, drainage, and soil, and to the economic background of proximity to a market. As a result of these differences of adjustment the five kinds of land use do not all occupy exactly the same areas: some parts of the Humid Pampa have been occupied by all of them in succession; other parts have never been occupied by more than one. The first form of land use at one time or another covered the whole area—this consists of livestock ranching without forage crops. This was followed by the second and third forms of land use which have been closely associated in both time and area. The increased demand for fat meat

[3] P. Denis, *The Argentine Republic*, New York, 1922.

[4] O. Schmieder, "Alteration of the Argentine Pampa in the Colonial Period," *Univ. Calif. Publ. in Geog.*, Vol. 2, 1927: 303-321.

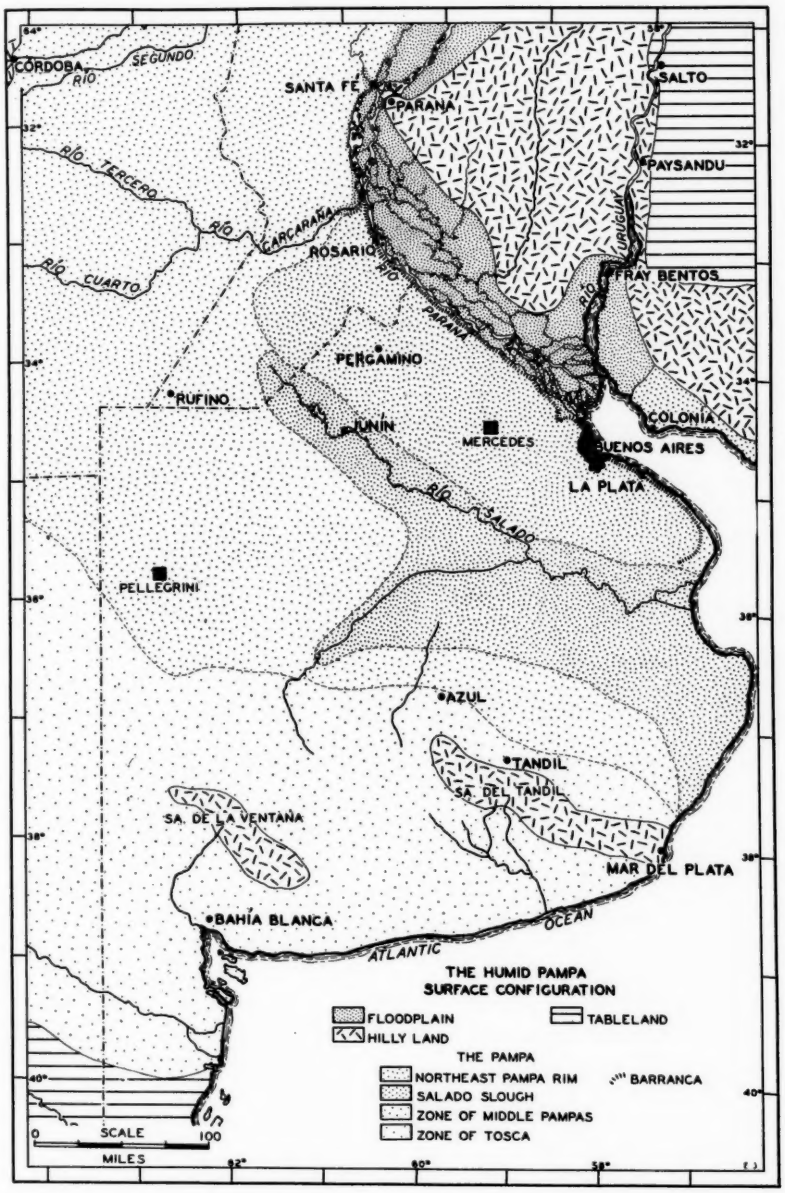

Fig. 1. The surface configuration of the Humid Pampa—tentative divisions of the Pampa based on reconnaissance notes by Pierre Denis.

animals led to the development of livestock ranching with forage crop agriculture (alfalfa). As a preparation of the land for alfalfa and also as a commercial crop for export, the use of land for wheat

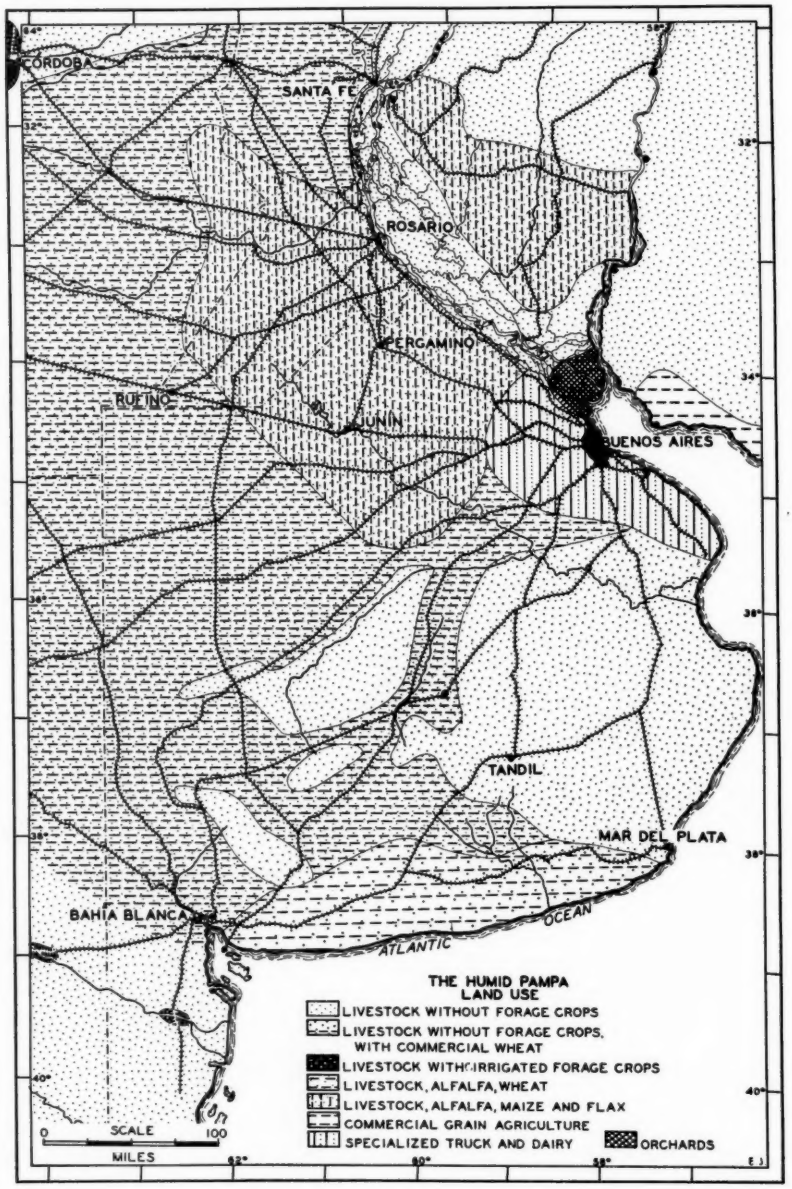

Fig. 2. The land use of the Humid Pampa.

came in. The fourth form of use appeared when maize (after 1895) and flax (after 1900) began to compete with wheat. The fifth and most recent form of use is intensive truck and dairy farming and fruit orcharding.

The result of this succession of forms of land use, each adjusted in a somewhat different pattern to the territory of the Humid Pampa, has been to introduce a considerable variety into a region which was once described as monotonously uniform. Physical elements, once of little importance, have been given significance in terms of man's systems of settlement. Today the Humid Pampa is anything but uniform.

The Humid Pampa is now differentiated into four major agricultural districts.[5] The first one is the *Pastoral District,* located in the southeast, north of Mar del Plata and Tandil, and including small outlying patches on the Pampa Sierras and in the wetter sloughs. In this district most of the land is still devoted to livestock ranching without agriculture. The second major division we shall call the Alfalfa-Wheat District. In it alfalfa is the chief crop in terms of acreage, and the most important commercial crop is wheat. Between the Pastoral District and the Alfalfa-Wheat District which borders it on the west and north there are transitional areas which some students might prefer to recognize as separate divisions. In the Zone of the Middle Pampas there is a wide transition in which, as one passes toward the west, larger and larger acreages of alfalfa appear. In the Zone of the Tosca, especially along the southern coast where the tosca is especially well developed, conditions are poor for alfalfa and the wheat invades the area where cattle are fed on grass pastures or on grain crops cut green for hay. The third division of the Humid Pampa is the *Maize District* located in the vicinity of Rosario, a district where maize is more important than wheat. In both the Alfalfa-Wheat District and the Maize District two of the five forms of land use are combined, for here the commercial agriculture is superimposed on a pastoral base. The fourth district is the *Intensive Truck, Dairy, and Fruit District* around Buenos Aires.

Only in the part of the Humid Pampa which we name the Northeast Pampa Rim (Fig. 3) have all the forms of land use occupied the same area in succession. The complete sequence is limited to the district around Buenos Aires. In the Maize District, to the west of Buenos Aires, four of the forms of use are or

[5] Compare the treatment of agricultural divisions presented by C. F. Jones, "Agricultural Regions of South America," *Economic Geography,* Vol. 4, 1928: The Regions of the Humid Pampa, pp. 6-30; and by W. S. Tower, "The Pampa of Argentina," *Geogr. Rev.,* Vol. 5, 1918: 293-315.

were at one time important—livestock ranching without agriculture, livestock ranching with alfalfa, commercial production of wheat, and now the commercial production of maize overlying the pastoral base. In this part of the Humid Pampa more than any other the landscape contains relict forms from these earlier periods, now modified or in process of modification by the spread of the most recent system. The other parts of the Humid Pampa, especially the southeast, have a relatively simple history of what geographers call "sequent occupance."

1. The Pastoral District.

In no part of the Humid Pampa at the present time, however, is less than 40 per cent of the land devoted to pasture (Fig. 3). The extent to which the pastoral base underlies even the most recent and most intensively utilized agricultural districts is a geographic fact which reveals the continued economic and social importance of this traditional Argentine activity. All around the margins of the Humid Pampa, and extending into the neighboring regions to the west and north, more than 80 per cent of the land is used for grazing. In the Pastoral District of the Humid Pampa, the land used for grazing also makes up more than 80 per cent of the area, and in some sections it includes more than 90 per cent.[6] Alfalfa and wheat cannot be grown in the southeast except at a high cost because of the large amount of swampy land which would require drainage. The moist, cool summers which are not beneficial to such crops as maize, are, on the other hand, ideal for the growth of pasture grasses. In the Pastoral District, there-

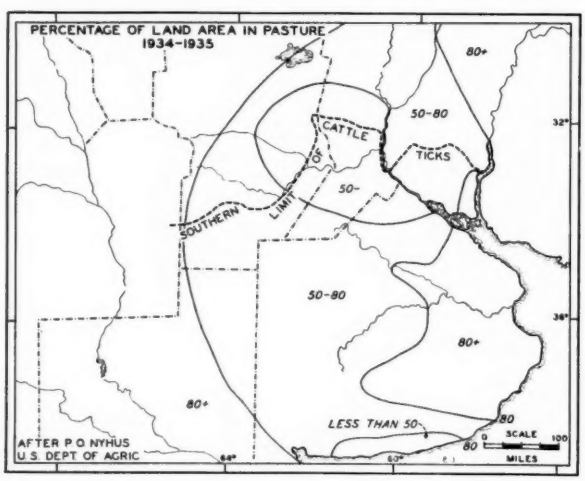

Fig. 3. Percentage of land area in pasture, and the southern limit of cattle ticks—based on maps by P. O. Nyhus.

[6] R. S. Platt, "Peripheral Items in the Argentine Pattern of Terrene Occupancy," *Trans. Illinois State Academy of Science*, Vol. 24, 1931: 410-423.

fore, livestock ranching without agriculture continues to characterize the use of the land.

The grazing activities of this area, however, are not at all the same as those which once characterized the whole of the Humid Pampa. The Pastoral District is a zone of concentration of high grade mutton and wool sheep; it is a zone of increasing importance in the production of butter; and it has become the chief breeding ground for beef cattle. Because of the ticks[7] the Northwest of Argentina has been unable to play the role of breeding ground for animals later to be fattened on the feed crops of the agricultural region—a relationship like that developed in the United States between the Western Range and the Corn Belt. Northern Patagonia, which is free from ticks, might play this part. At present, however, the chief source of yearling steers is this Pastoral District of southeastern Buenos Aires province. The existence within the Humid Pampa itself of good range lands in the southeast, unsuited to alfalfa and wheat, is, indeed, one of the most serious limitations on the rapid development of the pastoral possibilities of Northwestern Patagonia.

Because agriculture is so little developed in the Pastoral District this area has received few immigrant tenants. Few people are needed to care for herds of sheep or cattle altho the spread of dairying may demand the services of more workers. At present, however, this district has the lowest density of rural population of any part of the Humid Pampa—a density ranging from 10 to 25 people per square mile.

2. The Alfalfa-Wheat District.

In most parts of the Humid Pampa, the grazing activities have been accompanied by increased attention to the cultivation of crops. In a broad crescent, extending for six hundred miles along the western side of the Humid Pampa from Santa Fé in the north to Bahia Blanca in the south, the chief commercial crop is wheat. Generally wheat is associated with livestock ranching and alfalfa. Included in this district, however, are the two transitional areas previously mentioned. Along the southern Pampa shore, east of Bahia Blanca the animals are fed on native grasses or on rye and oats cut green for hay. Barley is also associated with wheat in this southern part of the Humid Pampa.

[7] See the map of the southern limit of ticks in C. F. Jones, *South America*, New York, 1930.

Of the several crops in the Humid Pampa not used for the feeding of animals, wheat, maize, barley, and flax are the four leaders. Wheat was the earliest of these; and the extension of wheat accompanied the increased demand for alfalfa. At the beginning of the First World War wheat, maize, barley, and flax, grouped together, occupied a little over 30,000,000 acres. There was a slight decrease of acreage after the War, with a low of 26,000,000 acres in the depression year of 1921-22. Thereafter, the acreage of these four crops increased gradually to about 44,000,000 in 1930-31; and since then the combined total has remained about even.[8]

The wheat acreage, on the contrary, has been unsteady. It reached more than 17,000,000 acres before the First World War, and, with fluctuations, climbed to a maximum, in 1928-29, of nearly 23,000,000 acres. During the last decade when wheat prices fell because of the world-wide depression, wheat acreages declined rapidly, dropping below pre-War averages in 1935-36 when there were only 14,000,000 acres planted. More recently, aided by droughts in North America, wheat prices and acreages have increased and in 1938-39 the area devoted to wheat passed 20,000,000 acres; but with a large decline of prices in 1939-40, wheat acreages again showed a decrease.[9]

This story of rapidly fluctuating acreages of wheat points to one of the fundamental peculiarities of the Argentine Humid Pampa. The fact is that the steady basis of the rural economy of this region is still pastoral, with alfalfa as the leading feed crop.[10] Wheat is raised by tenant laborers whose attachment to the estates is temporary and weak. An increase in wheat prices in relation to cattle prices results rather quickly in the settlement of more tenant families and an increase of wheat production; but a drop in price is also quickly reflected in decreasing acreages and in a decrease of tenant families in the wheat district. In recent years, a notable increase in the use of agricultural machinery has been accompanied by marked decreases in the number of tenants.

Argentina faces no problem of stranded populations on the dry margin of wheat cultivation such as troubles the dry-farming region of the North American Great Plains. In the first place the

[8] Data from U. S. Department of Agriculture.

[9] P. O. Nyhus, "Argentine Wheat," *Foreign Agriculture*, U. S. Dept. of Agriculture, 1939.

[10] A. E. Bunge, "La Agricola Argentina," *Rev. de Economia Argentina*, Vol. 37, 1938: 361-366.

sharpness of the contrast between the ground water conditions of the Humid Pampa and of the country to the west—as separated by a buried rock ridge south of the Córdoba Hills—was soon brought into such sharp prominence as a result of the spread of alfalfa that there was little doubt about the dry margin of the lands that could be devoted to this feed crop.[11] Even where wheat cultivation had penetrated beyond this limit the retreat to safer ground was easily accomplished by the removal of the tenants and the return of the estates to pastoral uses. In this case, looseness of attachment of people to the land was a distinct advantage in maintaining the economic flexibility of the area.

In the Humid Pampa the advantages of economic flexibility must be balanced against the disadvantages of social diversity. The large pastoral estates with their tenant farmers in all parts of the wheat region is a system of production which facilitates rapid readjustment to changing agricultural prices. Since the burden of debt mortgage and taxation is on the shoulders of the large landowners, recovery from periods of low agricultural prices is much more rapid than where the financial burden is carried by many small owners. But even in times of high prices, the tenants could make only a very poor living, and none of the unearned increment went to enrich this class of people. Only the fact that the tenant incomes were better than the incomes to which the immigrants were accustomed in their homelands made the situation tolerable. The social diversity thus created between a wealthy landowning minority and a landless majority must be balanced against regional economic flexibility if any complete evaluation of the system is to be attempted.[12]

The decrease in the number of large estates. Meanwhile a number of forces are leading to the decrease in the number of large estates. This change is slow: there are still at least fifty families in Buenos Aires Province with holdings of more than 75,000 acres each. There is still a steady resistance to the temptation to turn the increased land valuations into money thru actual sale. Much of this resistance is explained by the characteristic attitude of the Argentine landowner toward money income. He does not in-

[11] H. Stappenbeck, *Geologie und Grundwasserkunde der Pampa,* Stuttgart, 1926; and R. Hauthal, "Untergrund und Grundwasser in der argentinischen Pampa," *Pet. Mitt.,* Vol. 75, 1929: 311-315; and P. Denis, *The Argentine Republic,* loc. cit.

[12] "Immigration and Settlement in Brazil, Argentina, and Uruguay: II," *International Labour Rev.,* Vol. 35, 1937: 353-383.

vest surplus income as is commonly done in North America or parts of Europe: he spends it for better living, for the construction of golf courses, polo fields, or swimming pools on the estate, or for a town home in Buenos Aires, or for travel and a European education for his children. He does not achieve a position of prestige in his society thru the possession of money income, but rather thru the ownership of land, the production of high grade animals, and the establishment of his family in a town house in Buenos Aires. Increasing land values, therefore, have not led to the sale or mortgage of the estates to the same extent that it has in North America. There are no colonies of retired farmers, expecting to live on income from investments, as in the United States. Nevertheless there has been a trend toward the reduction in the size of the large holdings.

The movement to subdivide the large estates comes chiefly from three sources. In the first place the Argentine inheritance law, as in all countries whose legal system is based on Roman law, provides that all the children of a family must share equally in the estate left by the parents. An estancia of 100,000 acres inherited by four children is converted into four estancias of 25,000 acres each.[13] Some of the landowners, too, have been more successful than others in managing their estates. Some have run into debt through extravagant living, and have been forced to sell their lands piece by piece. The map of landed properties in any part of the Humid Pampa shows the effects of this irregular arrangement of subdivided lands, for patches of small farm units are grouped among the prevailing large ones wherever sales have taken place. And another movement leading toward an increase in the number of small properties has come thru the establishment of immigrant colonies on a few tracts of land developed thru the private initiative of land companies.

The Argentine wheat crop at present is still mostly produced by tenants. In 1932-33, of the farmers who harvested all the crops 65 per cent were tenants and they accounted for 80 per cent of the agricultural production. Considering the wheat crop alone, 75 per cent of it was harvested by tenants. The tenant farms ranged in size from 370 acres in the north to more than 1,000 acres in the south; there is a distinct tendency toward increase of size with the increased use of machinery. About 25 per cent of the wheat crop is

[13] R. S. Platt, "Pirovano: Items in the Argentine Pattern of Terrene Occupancy," *Am. Assoc. of Am. Geogs.*, Vol. 21, 1931: 215-237.

now raised on owner-operated mixed grain and livestock farms, on which the workers, being hired for wages, are somewhat more permanently attached to the land than in the case of the renters. Perhaps this last type of property is the one toward which the agricultural system is trending; but the trend will be slow because it must advance against the basic adverse attitude of the Argentine landlord toward agriculture as an occupation.

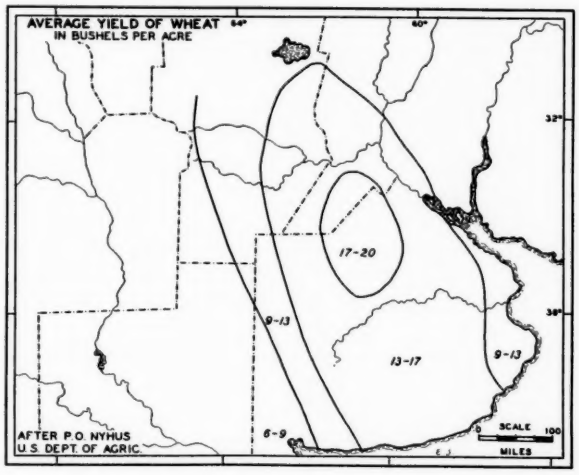

Fig. 4. Average yield of wheat—based on map by P. O. Nyhus.

The relation of maize and wheat. Wheat was the first grain crop to achieve a place for itself against the pastoral tradition of the Argentine Humid Pampa. It was grown first along the Northeast Pampa Rim, especially in the vicinity of Buenos Aires. Its great spread accompanied the invasion of the country south of the Salado Slough after 1880. Wheat also first brought prosperity to the colonies of European immigrants established northwest of Santa Fé. In the course of time wheat was planted in almost all parts of the Humid Pampa and proved successful in all but the southeastern part.

The yield of wheat, however, has been found to vary considerably within the Humid Pampa (Fig. 4). The best yields are found in an area southwest of Rosario, where an average of 17 to 20 bushels to the acre is reported.[14] Yields between 13 and 17 bushels are to be had on the average thruout the central part of Buenos Aires Province and southward to the southern shore. Yields decline rapidly, however, to the southwest, dropping to between 6 and 9 bushels along the "dry margin" west of Bahia Blanca. At present most of the wheat comes from the zone of less than 17 bushels to the acre, and almost none from the area of highest yields.

[14] P. O. Nyhus, *op. cit.;* and idem, "Argentine Corn," *Foreign Agriculture,* U. S. Dept. of Agriculture, 1938.

Since 1895 wheat has come more and more to feel the competition of maize, which also has its highest yields in the central district around Rosario. In this district an average between 30 and 40 bushels to the acre is to be expected. By 1912 there were approximately 9,500,000 acres of maize in Argentina, and most of it was in this central maize district newly developed out of the previous wheat area around Rosario. Maize holds its precedence over wheat in this zone because its yield amounts to nearly twice that of wheat and both crops bring about the same returns to the growers per bushel of grain.

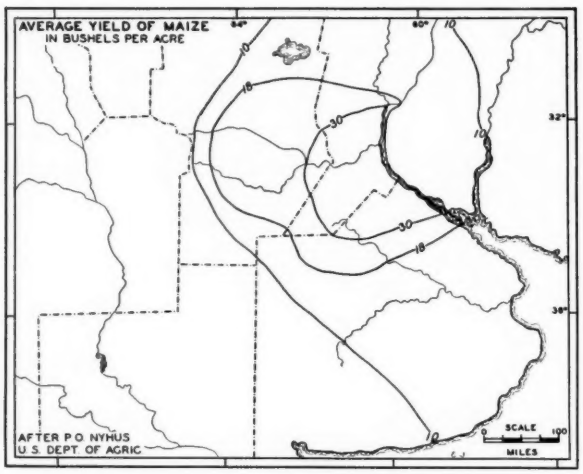

Fig. 5. Average yield of maize—based on map by P. O. Nyhus.

The decline of maize yields beyond the limits of the Rosario district (Fig. 5) indicates the relatively small area in which a favorable combination of fertile, well-drained soil, moderate temperatures, and dependable rainfall is actually to be found. Maize, especially, declines rapidly in its yield per acre as one moves into areas more frequently subject to drought. At Pergamino, in the center of the Rosario district, where the years of drought have been only 3 out of 25, the average yields of maize are about 38 bushels to the acre. Ninety miles to the southwest, where the years of drought came 10 times in a period of 25 years, the maize yields are only 17 bushels to the acre. This decrease is also partly due to the sandy nature of the soil and perhaps other conditions of drainage or temperature. In the Maize District, where maize yields are twice those of wheat (Fig. 6), maize occupies as much as 75 per cent of the land devoted to crops. Farther out toward the south and west, wheat soon equals maize and then exceeds it in acreage. In most of the area devoted chiefly to wheat the yield is nearly double that of maize, and in the territory west of Bahia Blanca it is more than double.

Flax entered the agricultural scene on the Humid Pampa about 1900, and was first extensively planted in the maize area. At first it was a favorite crop in the preparation of new land for other crops or for pasture. It, too, yields better in the Rosario district than elsewhere; but because of its greater resistance to heat and drought its yields do not drop off so fast as those of maize, especially to the north and east. In the Maize District, maize yields three times as much as flax per acre, but in Mesopotamia, north of the Paraná, it yields less than twice as much as flax. Under these conditions flax is grown with maize. Entre Rios, at present, is the chief flax-growing province of Argentina.

3. The Maize District.

The central district of high crop yields has gone thru all the steps in the historical succession of forms of land use on the Humid Pampa from livestock ranching without agriculture to specialization in maize as a commercial crop. Today there is an area extending for approximately 145 miles east and west, and for 155 miles north and south, centering on the river port of Rosario, in which maize occupies from 60 to 75 per cent of the area devoted to crops, and in which pasture occupies only 40 to 45 per cent of the total area. From 1912 to 1928 the area of this Maize District remained fairly steady, but after 1928 the acreage devoted to maize began to increase in consequence of increases in maize prices in relation to wheat prices. In 1935-36 more land was planted to maize than to wheat in the Humid Pampa. Since then maize has dropped again in favor of wheat. The increases of maize acreage were made by extending the maize area westward, into territory where the yields per acre are

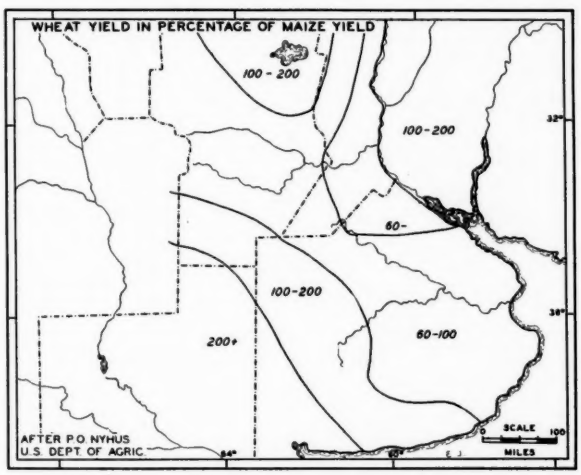

Fig. 6. Wheat yield in percentage of maize yield—based on map by P. O. Nyhus.

less than in the Rosario area. The Maize District as a whole produces enough to place Argentina second only to the North American Corn Belt among the maize-growing regions of the world.

The Argentine Maize District, however, differs from all the other similar regions of the world because of its emphasis on maize as an export crop. Some 80 per cent of the Argentine crop is exported, and Argentina accounts for 75 per cent of the world trade in maize. Rosario is the world's leading exporting city for this grain. Very little of the maize is fed locally to animals: altho the relatively small number of hogs in Argentina are concentrated in this district, there is no evidence of a trend toward the North American type of "Corn-Hog economy." About 90 per cent of the maize is the "flint" variety, characterized by small, hard kernels, low in water content—a type which is easily shipped and is in special favor for poultry feed in Europe. The "dent" varieties, used in North America chiefly to fatten hogs and cattle, are not popular in Argentina, and the local herds of domestic animals in the Maize District are fattened on alfalfa. The maize is loaded on the railroads for a short haul to the port of Rosario, where, with a minimum of transportation cost, it is loaded directly on ocean steamers. Rarely in South America do we find so favorable a combination of things; soils, climate, navigable water, proximity to the metropolis all combine to place this area among the world's most productive agricultural regions—now that it has been occupied by an agricultural people.

Landlords and tenants in the Maize District. Even in the Maize District, however, the sharp distinction still persists between the landowners whose interest is primarily in the grazing industries, and the tenants who raise the crops. About 66 per cent of the landed properties are large ones, still partly used for alfalfa pastures, and partly subdivided into tenant farms. Livestock and maize production are still two separate enterprises, involving the labor of two distinct groups of people. There are too few workers on the estancias to permit the cultivation of crops: and the tenure of the tenants is too insecure and their capital too small to permit their making a heavy investment in animals for fattening. Nevertheless there are more small farms and more large estates which have been devoted entirely to tenant farms under the supervision of a manager in the Maize District than elsewhere on the Humid Pampa.

Most of the crop is raised by tenants. Italian immigrants are

settled on tracts of land between 175 and 250 acres in size. In many instances the same tenant families have been planting maize with little rotation on the same pieces of land for more than 20 years; and frequently, also, one finds that these people have been able to save a considerable amount of money. Many of the more thrifty tenants have been able to buy small properties elsewhere, which they in turn rent to other tenants. But the striking difference in their traditional attitudes as compared with the Argentine landlords is nowhere more clearly exhibited than in their use of money income. Increasing wealth is to a much greater degree the dominant motive of the Italian immigrants than of the Argentines. Money saved is put to work to make more income. Yet the family continues to live in what seems like a comfortless adobe house, temporarily built to provide shelter and with no thought of permanence. There is no feeling for land ownership as such, no pride in property, no desire to remain on the land if, for any reason, it should fail to provide a substantial income. Unless this fundamental contrast in psychological attitude toward money and land is recognized there can be no real understanding of the relation of people to the land on the Pampa.

The Maize District is the part of the Humid Pampa which, excepting only the surroundings of the city of Buenos Aires, is occupied by the greatest density of rural people. The Maize District as a whole falls into the category of between 60 and 125 people per square mile. But this general figure gives, perhaps, a wrong impression. For on nearly half the area of the maize district the densities are much less than this, and in the areas occupied by the Italian tenants, the rural densities are well above the average figure. Something of the irregular distribution of the estancias and the small farms, suggesting the patches of dense population set in the midst of much less densely occupied land, can be seen from the accompanying maps.

4. The District of Intensive Dairy, Truck, and Fruit Farming.

The Maize District is cut off to the east by the beginning of a zone of intensive farming, devoted to the supply of the great metropolis of Buenos Aires. Small vegetable gardens even invade the outer fringes of the city, and surround the suburbs where the city is pushing forward its invasion of the countryside. In this district around Buenos Aires there is not only the advantage of easy access

to the urban market, but also the advantage of a climate with winters mild enough for fresh vegetables to be produced thruout the year.

Not until the First World War, however, did the zone of intensive farming begin its important development. Before 1914 the people of Argentina had to depend on foreign supplies of dairy products, producing very little of these things themselves. European canned milk and butter provided for the needs of the Buenos Aires market. Only when the currents of international trade were interrupted by the War did the Argentines turn to the production of their own food supplies.

Dairying is now concentrated in the zone to the southeast of Buenos Aires, extending southward into the eastern part of the Humid Pampa. Because of the large proportion of swampy land in this section, and because of the cool summers and abundant rains, rich pastures of grass furnish good grazing for herds of high-grade dairy animals. Alfalfa and maize do not prosper. The population, therefore, is largely composed of pastoral specialists and not farmers. Most of the land is divided into large estates, subdivided and rented to tenant dairymen.

Vegetables for the Buenos Aires market are produced close to the city. The small farms range in size from a few acres to twenty-five or thirty. The truck farms are clustered along the railroad lines, and on land within the urban limits not otherwise used. As the Argentine diet is changed to include more and more fresh vegetables, the prosperity of this fringe of intensive truck farming is increased.

Similarly the increase in the demand for fresh fruit among the people of Buenos Aires is reflected in a concentration of orchards located within easy range of the market. The delta of the Paranà River provides a remarkably favorable site for this kind of activity. Along the floodplain of this river, the presence of warm water from the north permits a long southward extension of tropical or subtropical kinds of plants. It has been found that such fruits as apples, pears, plums, peaches, and many others, yield excellently on the islands near the junction of the Paraná and the Uruguay. The suburb of Buenos Aires, known as Tigre, is not only a recreation center but also the nucleus of a new fruit-orchard district. Much of the land on the islands is owned by large fruit companies and worked by hired laborers. In addition to the orchards, there

are plantations of willow and poplar, used for the construction of the baskets and boxes in which the fruit is sent to market.

Within the relatively small area of this general district of intensive dairying, truck farming, and fruit raising, the density of the rural population is much higher than anywhere else on the Humid Pampa. In the immediate vicinity of the city, densities mount to well over 125 per square mile.

Conclusion

The landscape of the Argentine Humid Pampa is no longer one of undifferentiated monotony. During the last 60 years the land has been occupied by two separate groups of people: the pastoral landlords and the agricultural immigrants. The succession of pastoral and agricultural forms of land use have each been adjusted to the physical and economic qualities of the area in a somewhat different manner. The result is a region already rich in sequent occupance, a region in which the marked differences cannot be properly understood without reference to historical sequence as well as to the relatively unchanging, but only recently important, physical qualities of the land.

The Humid Pampa must now be classified as a region of high productivity. Yet its productiveness is in reality a very recent development, something which has taken place within the memory of men now living. This region belongs with a group of similar lands scattered in different parts of the world which have been found to be especially suitable for the needs of commercial grain farming, and which were not already devoted to other uses by relatively dense populations before this particular period of Occidental economic history arrived. Furthermore, the Argentine Humid Pampa differs in certain important ways from the other regions of its class. The continued existence of the pastoral base, the tradition of the latifundia, and the tenant workers have made the process of settlement something different in this region from the process as carried on elsewhere. The freedom from the problem of stranded populations on the dry margin is especially striking to students who are familiar with the North American Great Plains. The high productivity of the Humid Pampa, then, is the product of a particular culture, acting at a particular moment of history, on a peculiar kind of land. No interpretation can be sound which neglects consideration of the interaction of all these elements.

BRAZIL TAKES A CENSUS

CHARLES A. GAULD
Library of Congress, Washington, D.C.

Brazil took its fifth general census in the Fall of 1940. Our greatest New World neighbor skipped the count scheduled for 1930, the year of the revolution in which Getulio Vargas and his cowboys from the southernmost state of Rio Grande do Sul swept into Rio and national power. The last census was in 1920, when Brazil had about 30,000,000 inhabitants.

Some 45,000 enumerators in Brazil's 3,300,000 square miles will count an amazingly diverse population of possibly 43,000,000 people. So isolated are some villages of the far interior grasslands and mountains and the Amazon jungle, that it will take weeks for the returns to reach Rio. Many Indian settlements on the smaller tributaries of the Amazon, over two thousand miles from the Atlantic, can be reached only by launch and canoe. Some of the naked Indians of the innermost jungle, in the heart of the South American continent, have scarcely seen a white man since the collapse of the wild rubber boom twenty-five years ago. Occasionally census enumerators may have run grave risk of fever, accident, and even harm by Indians who were victimized and enslaved by rubber seekers thirty years ago. As during many periods of United States history, the Indian found only disease and death at the hands of the white man. Scattered thru two million square miles of hills, grasslands, and tropical rain forests, mostly along lonely rivers, are the remaining pure Indians of Brazil. They were not counted in the censuses of 1872, 1890, 1900, and 1920. No one knows how many there are, but they are usually estimated as well under a million. It remains to be seen how many will be counted in this census.

THE CENSUS TASK

For weeks the returns will pour into Rio de Janeiro from enumerators who have visited homes in all the different sections of Brazil. Earliest probably will be the returns of cosmopolitan Rio. Past censuses have all dealt more fully with Rio as the national showplace and capital, than with any other part of Brazil. Next may come the returns from the prosperous industrial and agricultural states nearest Rio in South Brazil. There are the states of Rio de Janeiro and Espírito Santo with their light-industries and

sugar and coffee plantations. Just inland from them is Minas Gerais, one of the world's great mining areas. The census will show Minas Gerais to resemble Texas and California in size and diversity. With doubtless over 7,400,000 inhabitants, it is Brazil's first state in population and its second in coffee, manufacturing and nearly everything else.

In the far south are Paraná, Santa Catarina and the gaúcho state, Rio Grande do Sul. From this state of pampas and fine herds of cattle comes President Vargas, since 1930 the strong man of Brazil. Most impressive of all will be the statistics from the state and city of São Paulo, the heart of South Brazil and of the nation. São Paulo is the richest and most dynamic of Brazil's twenty states, producing a greater proportion of federal government revenue than any other half-dozen states. São Paulo city, the country's business capital, is often called "the Los Angeles of South America." These southern states are in the temperate zone with cattle, agriculture, and industrialization like parts of our South and Mid-West. They alone are connected with Rio by both rail and steamship lines, federally-owned.

NORTH BRAZIL

Slower to be enumerated may be the north and northeast of Brazil. The northeast has a densely-populated coastal plain for centuries characterized by big sugar and tobacco plantations, run by the labor of millions of Negroes. Its historic ports are noted for colonial churches and old buildings. Here the Dutch for a few decades seized and profitably ran an enormous sugar plantation colony until driven out in 1654. Nieuw Amsterdam was then but a village. From the bulge of Brazil, that juts out toward Africa into the South Atlantic, to the Amazon jungles, are the part-Indian states of North Brazil. Their capitals are all seaports, several of which France tried to seize, along with the mouth of the Amazon, at the very time she was settling New Orleans. Needless to say, if either Holland or France had succeeded in holding tropical northern Brazil, the census would have a very different task.

The hilly interior is isolated and retarded, suffering in large areas from droughts and a lack of rail and motor roads. Its cattle, cotton and tropical products give northern Brazil little wealth and commerce for the census to record. Industries and big cities are few in this least-favored region over whose sun-baked towns fly the planes of the rival airways of Germany and the United States.

South Brazil Dominant

The census data will show indirectly that Rio, Porto Alegre and São Paulo and the industrialized states of southern Brazil control the nation's economic life and destiny. In this region, comparable to our Northeast, are most of the banks, cultural institutions, factories and major cities. To them have migrated many Europeans and generations of young Brazilians in search of careers, just as young Americans seek opportunity in our national capital and chief cities.

Comparison with United States

The forty-five questions asked of individuals and families resemble those in our census and will bring out certain interesting social and economic differences between the American and Brazilian peoples. When the returns of both censuses are analyzed, it will be clear that Brazil and the United States are several decades apart in economic development and the resulting social effects.

For example, Brazil has the population and level of industrialization of the United States ninety years ago. Most Brazilians live in rural communities, raise large families, and have poor transportation facilities except by water—just like North Americans in 1850. Brazil in 1940, however, has far fewer foreign-born than this country in 1850 or 1940, because Brazil received in the past century but 4,600,000 immigrants. This is only a small fraction of the immigration to the United States. As a result of war and starvation and chaos in Europe during the next decade, Brazil's 1950 census, if not interrupted by internal troubles of its own, may record the presence of a considerable number of new immigrants. People are badly needed to populate its largely empty interior and as additions to its small class of educated and skilled farmers and workers.

Race Mixture

Brazil's census will differ from ours in one interesting respect, namely race. We are overly-precise in listing all non-Caucasions as such, even to the point of labeling as Indian or Negro those who are three-quarters white. Brazil lacks this Anglo-Saxon preoccupation with race, having inherited Portugal's tolerance in race relations. As a result of four centuries of mixture of Portuguese colonists with Indians, Negroes, and those of mixed blood, Brazil is the world's most unusual melting pot.

Brazil's census is not expected to show race mixture very clearly, any more than the previous ones. (Vera Kelsey's *Seven Keys to Brazil,* 1940, which is excellent on race mixture, says that since the creation of the republic in 1889, mention of race has been avoided in Brazilian censuses largely in deference to the former slaves, the last of whom were freed without bloodshed or bitterness in 1888.) Several million of the estimated 43,000,000 Brazilians who are partly Indian or in part Negro may be listed as Caucasian.

Why not? In the first place, the officials would have too much difficulty specifying and determining complex combinations of Indian, Caucasian, and Negro blood. Furthermore, few educated Brazilians, knowing our prejudices, care to publicize details of large-scale miscegenation, about which they feel some embarrassment. They realize that their country may have only about 14,000,000 whites, or a third of the population. Most of the whites live in dominant South Brazil.

Contrastingly, there are possibly sixteen million Brazilians with a noticeable amount of Negro blood, amounting to roughly 40 per cent of the nation. We have some 13,000,000 Negroes and mulattoes who form only 10 per cent of our 130,000,000. In Brazil the most numerous group are the mulattoes and persons of three-way mixture. There are many nearly pure Negroes in northeastern Brazil, which is the black belt. It is a great plantation area racially and culturally comparable to our black belt of the deep South but with fewer whites. Gilberto Freyre, the eminent authority on northeastern Brazil, feels there are practically no Negroes there without some admixture of Indian or white blood.

Comparisons with Spanish America

In northern Brazil, between the bulge and the Amazon valley, are most of the possibly 8,000,000 persons of mixed Indian and white descent. The few pure Indians are numerically unimportant. The Indian forms a far greater element in the total bloodstream of Brazil than in North America, but a lesser amount than in most Spanish American countries except Uruguay and Argentina.

Brazil, unlike Mexico, Central America, and the Andean nations, is definitely not an Indian-and-mestizo nation. Racially it more closely resembles the Caribbean islands, where Negro blood has for centuries been prominent or predominant. In Cuba, the Dominican Republic, Haiti, and Puerto Rico there is almost no Indian

blood, as the Indian died off before 1550 and the hardier Negro appeared as the plantation laborer. The 1940 census will not be very helpful in understanding Brazil's racial composition, but out of these diverse elements, Brazil is fusing a new race under the tropical sun, tolerant, talented, and richly endowed with the things of the spirit.

Whites in Brazil

More accurate in the census will be the information obtained on the national origins of white Brazilians. Heads of families, their wives, and any living grandparents will be asked the country of origin of themselves and their parents. This may somewhat alter the writer's table of estimates based on five years of reading:

Portuguese descent	5,500,000
Italian or half Italian	3,800,000
German or half German	1,100,000
Spanish, Slavic, Syrian, etc.	3,600,000
Estimated total	14,000,000

It will be noted that most white Brazilians are descendants of immigrants from fascistic countries. Many of these Brazilians have relatives living under totalitarianism. They form the dominant element in Brazil, whereas we in the United States like to think we are farther removed from European ties and influences.

An examination is now in order of the possibly 14,000,000 whites in Brazil whose national origins the census will disclose.

As Brazil's mother country, little Portugal has sent it the most settlers from Europe. Indeed, for years Portugal's chief export was peasants. Its kindly and pleasant people have gone to Brazil in a steady stream for four centuries. Most left Portugal pious and illiterate and with little or no capital to invest. Today they have no powerful fatherland behind them. Many in Brazil became rich, educated, and progressive. A great number have thru hard work risen to the middle class. But others of Portugal's immigrants live in nearly the same poverty and ignorance and on the same bad diet of manioc meal, rice, and beans as the millions of Brazilian peasants and townspeople of mixed race. In general, the five or six million Brazilians of pure Portuguese ancestry have a love of culture, a zest for life, notable talents in music and literature, and exceptional freedom from race prejudice.

Since Brazil became independent of Portugal in 1822, however, Italy has contributed even more peasants to Brazil than has Portu-

gal. In many years toward the end of last century, the number of Italians arriving in southern Brazil was several times as great as the total of all other colonists. Like the Portuguese, most of the Italians came poor and illiterate from a backward homeland. They have readily merged with the predominant population of Portuguese descent in South Brazil.

The German migration, chiefly via Hamburg, was small but steady. For a century Germans have been gradually expanding in numbers and influence in Brazil's important southern cities and agricultural zones. Many German-speaking Brazilians originated in Austria-Hungary and in Eastern Europe's Lutheran colonies of Germans. Most have tended to retain their language and customs, and their farming and business ability. Some non-German Brazilians have intermarried or sent their children to German schools, influential in a land of over 70 per cent illiteracy. There may be somewhat over a million German-Brazilians, but there are nearly four times as many of Italian or part-Italian ancestry. Both groups have made significant contributions to Brazil's development. The German-Brazilians have been the more successful in diversified farming and trade, and because of their education and better health they are more prosperous than the masses of mixed blood in northern Brazil.[1]

In recent decades several thousand Japanese have gone annually to Brazil. Like our capable Japanese-Americans in Hawaii and California, they are fine truck-farmers and shopkeepers. Most live in rich São Paulo state. There are fewer than 270,000 in all Brazil. Interestingly, they are generally from Kyushu, the isle of Japan most visited by Portuguese merchants and missionaries in the sixteenth century when Brazil was in its infancy as but one among Portugal's many colonies, for its brief empire was the first on which the sun never set.

Some Brazilians dislike their Japanese fellow citizens despite the fact that thousands of them are good Brazilians, adopting the language, customs, and Christianity. In fact, most of Brazil's citizens of Slavic, Italian, Syrian, and Teutonic origin have similarly adopted Brazilian culture, adding distinctive qualities to the national life of Brazil in the same way that our later immigrants have become Americanized, enriching life in the United States.

[1] For the same reasons, German-Brazilians are important from a military viewpoint. Most Brazilians dread a Nazi victory.

The census will show the distribution and blending in Brazil of the descendants of the 4,600,000 European colonists since independence. About 80 per cent have been Latins from lands now Fascist. Some 2,500,000 went to São Paulo state alone, as it has been rapidly expanding since 1890. Over a million Italians went to this state. The census may show that they and their children comprise over two million of the state's 6,500,000. Some of them are rich. The tallest building in Brazil, towering over São Paulo's busy downtown triangle, bears the Italian name Martinelli. Brazil's chief chain of factories is Italian-owned.[2]

We North Americans may well look forward to the publication of the fifth Brazilian census. With the decline of France and Italy in the coming post-war chaos, Brazil may supersede them as the greatest land of Latin culture.

[2] Americans reading the census figures will think that São Paulo and other Brazilian cities are larger than they really are. This is because Brazil customarily gives the population, not just of the city limits, but of the city, all its suburbs, and the surrounding area of the "município, equivalent to a county here. Not realizing this, United States writers will perhaps continue to make the error of not allowing for this or pointing it out.

THE CHOROGRAPHIC COMMENTATOR—A GEOGRAPHIC GUIDE TO RELATIONSHIP THINKING

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Geographers may disagree on the exact definition of geography, or the precise nature of its philosophy or functions. But all will doubtless agree that geography is intrinsically a science of inter- and intra-regional relationships as concerns human activities in their environmental settings.

It is recognized that man does not live in a vacuum, nor are life's patterns simply the result of blind chance or human volitions. Accordingly, every study of the structure and functioning of human society and of government is necessarily incomplete which leaves out of account the physical stage on which the drama of human life and world events is enacted.

But as every geographer well knows, the task of pointing out and correlating the more cogently and closely related regional factors of a given situation is not an easy one. In fact, good chorographic (regional) description, which clearly interprets the human affairs of the home community, the significance of national events, or the ramifications of international problems, calls for not only intimate familiarity with a host of geographic facts, but also the ability to marshal these facts into proper co-ordination and correlation.

The world stage is indeed complex, but in every regional scenario certain characteristics of the stage and its actors stand out, as in any plot. Geographic interpretation, then, depends first of all upon recognizing the elements that dominate the landscape picture and the story. Secondly, the geographer must establish the correct regional synthesis by pointing out just how these elements are rooted in their particular environment, and how they are related one to another.

Purpose and Form of the Chorographic Commentator

To aid the geography student to see and to carry out these principles, particularly as they apply to the analysis of present-day world problems, the *chorographic commentator* is suggested (Fig. 1). It consists of a cellophane-covered wallboard, 4 feet by 6 feet, which lists all the commonly recognized physical and cultural fea-

tures of the landscape. The former, numbering 375, appear on the left side; the latter, numbering 246, on the right side. All the physical and cultural landscape features are classified under conventional headings, and to each is affixed a numbered tack for reference purposes. In the center of the board, upper part, is a glass case in which are exhibited pertinent map or other illustrative ma-

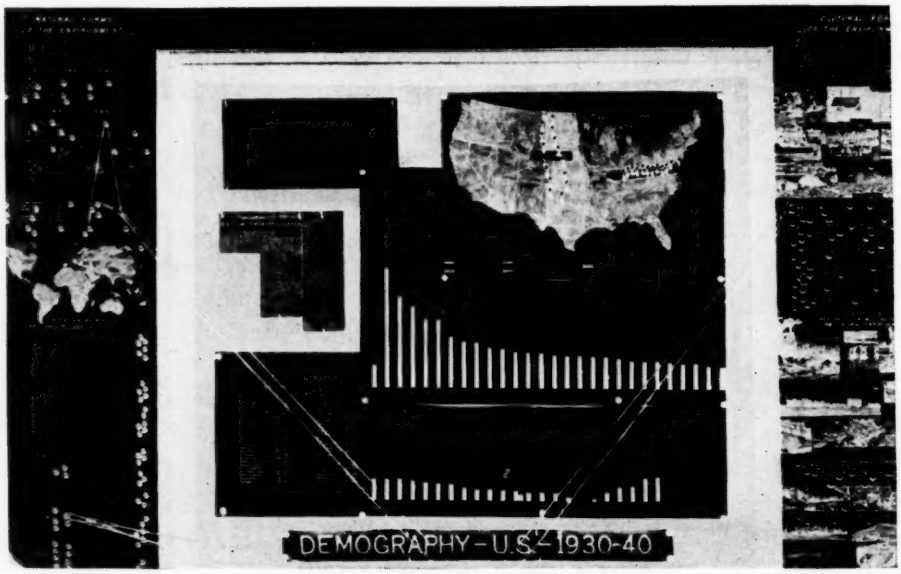

Fig. 1. A view of a part of the chorographic commentator showing the details of the permanently fixed index guide to the physical and cultural world features (left and right, respectively). Radial lines consist of rubber bands linking some of the pertinent features referred to in the current chorogram, or news commentary.

terial referred to in the news commentary. In the center below, are permanently fixed atlas maps and statistical material which serve the purpose of general reference. Between these illustrative sections space is set aside for the news commentary itself—the *chorogram.*

FUNCTIONING OF THE CHOROGRAPHIC COMMENTATOR

A chorographic treatment of a news item determines first of all which of the 621 numbered tack features constitute the basic correlation criteria. These form the geographic key points or topical outline guide for the chorogram. Next, these key items are connected by strands of rubber bands, representing bonds of geographic relationships, which link together, as it were, the inter-

related stage and story elements. Having thus constructed what may be called the *chorograph* (Figs. 2 and 3), the geography student uses this form like a map to help vizualize the relationship bonds which must be stressed and properly correlated if the event or problem under consideration is to be interpreted truly geographically.

But not only does the commentator aid the student in composing chorograms; it also indicates how the selected forms for the chorogram are related to the other geographic forms on the board. This feature thus gives an integrated pattern concept of the whole field and distinctive function of geography. It makes the student of human geography chorography conscious.

Sample Chorograms

While chorograms, of course, may be of any practicable length, they are here restricted, for brevity's sake, to the size of approximately a typewritten page. Specimens (revised by the author) are herewith submitted from two of the students participating in the program of weekly news comments. These are based on chorographs Fig. 2 and Fig. 3, respectively.

Chorogram: Population Decline—A Study of Geographic Maladjustment in the "Dust Bowl," United States*

Climate and physical geography have much to do with population changes, as a study of the accompanying United States map of population increase and decrease, and the *chorograph* consisting of the radial pattern of rubber bands, shows (Fig. 2).

As reported in the posted news item the five states which lost the most population between 1930 and 1940—North Dakota, South Dakota, Nebraska, Kansas, and Oklahoma—lie partly in the region of the "Dust Bowl" (area bounded by yellow pins). Semi-arid climate (#60, left), and extreme wind erosion (#218, left), and a geographically maladjusted agricultural program are responsible for the "Dust Bowl."

In middle latitude steppes (#373, left) found in deep interiors far from the ocean and on the leeward side of mountains (note position on map), 70 per cent or more of the annual precipitation occurs in summer (#60, left). This favors agriculture. But farmers

* By Miss Jessie Swanson.

risk 25 per cent departure from the yearly normal. In 30-40 per cent of the years the rainfall is less than 85 per cent of the average.

In spite of the gamble, farmers try semi-humid crop culture and dry-farming in the area, with wheat, rye, and barley as the chief crops (#77, 84, right). Cultivation of the original grassland prairie has exposed the fertile top soil to wind erosion (#218, left). The western rim of the Dust Bowl at the foot of the Rockies experiences strong and frequent Chinook winds (#41, left). These descending winds from the mountains, by adiabatic heating, produce a desiccating effect on the crops. The prevailing westerlies transport eastward literally tons of earth, some of which, several years ago, was deposited on our doorsteps here in the Middlewest. As a result, thousands abandoned their homes, their now worthless fields (see statistical table, left), and set out for more hospitable lands, such as California, the state of greatest population increase (see graph). Many became modern nomads similar to those of unsettled life in other dry countries (#4, right).

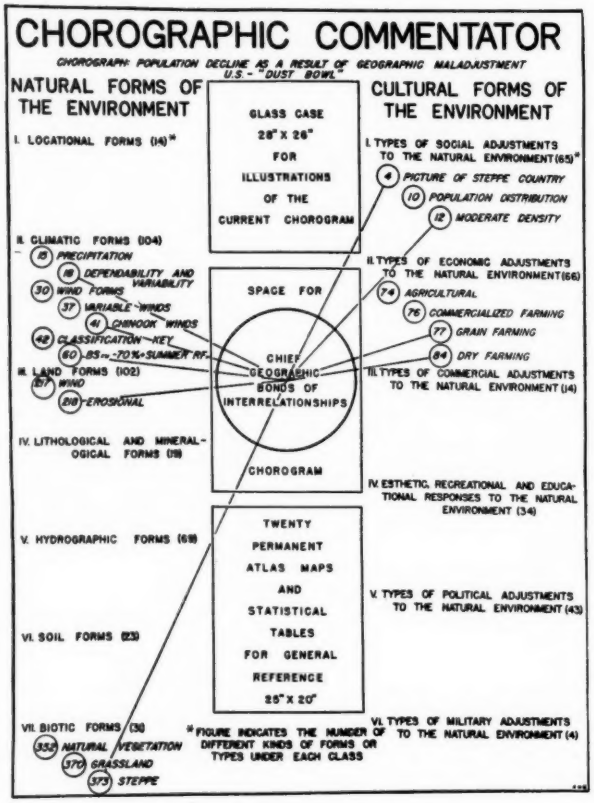
CHOROGRAPHIC COMMENTATOR
CHOROGRAPH: POPULATION DECLINE AS A RESULT OF GEOGRAPHIC MALADJUSTMENT U.S. - "DUST BOWL"
NATURAL FORMS OF THE ENVIRONMENT
I. LOCATIONAL FORMS (14)*
II. CLIMATIC FORMS (104)
(15) PRECIPITATION
(18) DEPENDABILITY AND VARIABILITY
(30) WIND FORMS
(37) VARIABLE WINDS
(41) CHINOOK WINDS
(42) CLASSIFICATION KEY
(60) 85 m. -70 %-SUMMER RF.
III. LAND FORMS (102)
(67) WIND
(218) EROSIONAL
IV. LITHOLOGICAL AND MINERALOGICAL FORMS (19)
V. HYDROGRAPHIC FORMS (69)
VI. SOIL FORMS (23)
VII. BIOTIC FORMS (30)
(332) NATURAL VEGETATION
(370) GRASSLAND
(373) STEPPE
GLASS CASE 28" X 26" FOR ILLUSTRATIONS OF THE CURRENT CHOROGRAM
SPACE FOR CHIEF GEOGRAPHIC BONDS OF INTERRELATIONSHIPS CHOROGRAM
TWENTY PERMANENT ATLAS MAPS AND STATISTICAL TABLES FOR GENERAL REFERENCE 25" X 20"
CULTURAL FORMS OF THE ENVIRONMENT
I. TYPES OF SOCIAL ADJUSTMENTS TO THE NATURAL ENVIRONMENT (65)*
(4) PICTURE OF STEPPE COUNTRY
(10) POPULATION DISTRIBUTION
(12) MODERATE DENSITY
II. TYPES OF ECONOMIC ADJUSTMENTS TO THE NATURAL ENVIRONMENT (66)
(74) AGRICULTURAL
(76) COMMERCIALIZED FARMING
(77) GRAIN FARMING
(84) DRY FARMING
III. TYPES OF COMMERCIAL ADJUSTMENTS TO THE NATURAL ENVIRONMENT (14)
IV. ESTHETIC, RECREATIONAL AND EDUCATIONAL RESPONSES TO THE NATURAL ENVIRONMENT (34)
V. TYPES OF POLITICAL ADJUSTMENTS TO THE NATURAL ENVIRONMENT (43)
VI. TYPES OF MILITARY ADJUSTMENTS TO THE NATURAL ENVIRONMENT (4)
* FIGURE INDICATES THE NUMBER OF DIFFERENT KINDS OF FORMS OR TYPES UNDER EACH CLASS

Fig. 2. The chorograph (indicated by radial pattern) reveals the cogency of climatic elements critical in the settlement situation of the "Dust Bowl."

The solution of this problem of geographic maladjustment will be a long, gradual process. The federal government, realizing the seriousness of the problem, is subsidizing a reclamation program which includes the planting of trees adapted to the region to form shelter belts across the prairie land from north to south as a pro-

tection against wind erosion. (Consult Barton's article "The Great Plains Tree Shelterbelt Project" in the JOURNAL OF GEOGRAPHY, Vol. 35, pp. 125-135, 1936.)

The present study illustrates how important it is for man to study his environment and properly adapt his land utilization program to it. It illustrates the dire need for a program of geographic education.

CHOROGRAM: THE GEOGRAPHY OF THE JAPANESE PETROLEUM PROBLEM*

The Far East has been vividly brought to our minds during the last few weeks by the Japanese struggle for prominence (see news dispatches). It is a struggle arising from geographic adversity —poverty as to productive land and natural resources.

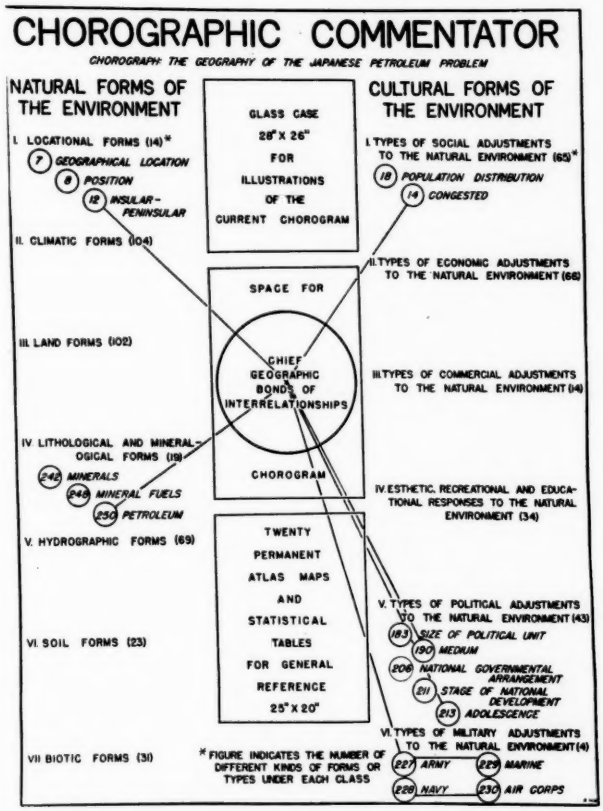
CHOROGRAPHIC COMMENTATOR
CHOROGRAPH: THE GEOGRAPHY OF THE JAPANESE PETROLEUM PROBLEM
NATURAL FORMS OF THE ENVIRONMENT
I. LOCATIONAL FORMS (14)*
7 GEOGRAPHICAL LOCATION
8 POSITION
12 INSULAR-PENINSULAR
II. CLIMATIC FORMS (104)
III. LAND FORMS (102)
IV. LITHOLOGICAL AND MINERALOGICAL FORMS (19)
242 MINERALS
248 MINERAL FUELS
250 PETROLEUM
V. HYDROGRAPHIC FORMS (69)
VI. SOIL FORMS (23)
VII BIOTIC FORMS (31)
GLASS CASE 28" X 26" FOR ILLUSTRATIONS OF THE CURRENT CHOROGRAM
SPACE FOR
CHIEF GEOGRAPHIC BONDS OF INTERRELATIONSHIPS
CHOROGRAM
TWENTY PERMANENT ATLAS MAPS AND STATISTICAL TABLES FOR GENERAL REFERENCE 25" X 20"
CULTURAL FORMS OF THE ENVIRONMENT
I. TYPES OF SOCIAL ADJUSTMENTS TO THE NATURAL ENVIRONMENT (65)*
18 POPULATION DISTRIBUTION
14 CONGESTED
II. TYPES OF ECONOMIC ADJUSTMENTS TO THE NATURAL ENVIRONMENT (66)
III. TYPES OF COMMERCIAL ADJUSTMENTS TO THE NATURAL ENVIRONMENT (14)
IV. ESTHETIC, RECREATIONAL AND EDUCATIONAL RESPONSES TO THE NATURAL ENVIRONMENT (34)
V. TYPES OF POLITICAL ADJUSTMENTS TO THE NATURAL ENVIRONMENT (43)
183 SIZE OF POLITICAL UNIT
190 MEDIUM
206 NATIONAL GOVERNMENTAL ARRANGEMENT
211 STAGE OF NATIONAL DEVELOPMENT
213 ADOLESCENCE
VI. TYPES OF MILITARY ADJUSTMENTS TO THE NATURAL ENVIRONMENT (4)
227 ARMY
229 MARINE
228 NAVY
230 AIR CORPS
* FIGURE INDICATES THE NUMBER OF DIFFERENT KINDS OF FORMS OR TYPES UNDER EACH CLASS

Fig. 3. The chorograph (indicated by radial pattern) features the petroleum situation of Japan.

The Japanese Empire (shown in red on the map) is an insular peninsular area (#12, left). It is classed politically as of moderate size (#190, right). But its actual size and strength, as in the case of other nations, must be evaluated in terms of areal productivity. The Empire of Japan is about the size of the state of Texas, however the actual productive area of Japan is equal only to an area the size of the state of West Virginia. On this size area lives a Japanese

* By Miss Dorothy Saeger.

population equivalent to the population of our states of North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Minnesota, Iowa, Missouri, Arkansas, Louisiana, Wisconsin, Illinois, Michigan, Indiana, Ohio, Kentucky, Tennessee, and Mississippi. Japan among all nations is the most congested (#14, right) and has the most critical population pressure problem, as pointed out by Van Valkenburg, one of America's leading political geographers.

Japan has been constantly growing in population, but land areas acquired such as Korea and Formosa were already over-populated. As for Manchuria, Chinese immigration has been ten times as great as Japanese, causing constant strife between the two types of people. Hence Japan must exercise control over critical world resources if it is to continue as a world power.

Now Japan is classified by geographers as an "adolescent" nation (#213, right). This means that it is a dynamic and belligerent world power, such as Germany and Italy, striving to secure raw materials to maintain its rank as a world manufacturing and trading nation. (For other state classification terms, see associated numbers.)

In order to carry out its present aggressive war policy Japan must above all have large supplies of fuel power, and that fuel is oil. (#250, left). But Japan is sadly deficient in oil. The entire annual local production of petroleum is equal to only 70 per cent of that produced in the United States in one day. This is produced primarily in Sakhalin, partly on territory leased from Russia (silver pin on map). Therefore Japan must import from 90 to 95 per cent of the petroleum needed to fuel her tanks (#227, right), destroyers (#228, right), and aircraft (#230, right).

The United States (red pins) placed an embargo on aviation gasoline to Japan. Mexico, under the "friendly neighbor policy" of the western hemisphere, has done likewise, and perhaps the South American countries will follow suit (green pins). The oil of the Balkan, Russian, and Iran-Iraq fields (yellow pins) is needed in Europe. It is also not likely that England will permit any oil from Burma (blue pin) to reach Japan. From *Time* magazine and the *Christian Science Monitor* we learn that the Royal Dutch Shell and the Standard-Vacuum Oil companies in the East Indies (orange pin) have contracted to supply 40 per cent of Japan's oil needs for six months, but these companies operating under British and

American interests can probably not always be depended upon to fill the contract.

Where then can Japan turn for this all important strategic war material?

Selection of Chorographic Topics

Much of the success of reviewing current events geographically depends upon a careful discrimination and evaluation of news sources and news items. Such news items must be of the type that lend themselves to a geographic orientation. Not every news item certainly possesses this geographic quality. The chorographic commentator will serve here too as a guide. We may rest assured that if the news item in no important particular touches on matters directly or indirectly referable to the forms on the board then the material is essentially non-geographic.

Another consideration is that the topics should be timely, deal with vital problems, and as a rule, concern many people. These conditions are usually met by such questions as deal with: population pressure, decline, etc.; racial anti-nationalism, irredentism, and other ethnographic problems, elements of national security, vulnerability, defense bases, etc.; problems related to national resources, conservation, regional planning; economic nationalism, domestic and foreign trade; types and conditions of land utilization; geographic adjustments of various national, racial, and occupational groups in relation to environmental factors.

Thus the chorographic commentator is intended to 1) stimulate an environmental interest in world affairs, 2) bring about regional consciousness as to the world order, and 3) to teach the art of sound geographic relationship thinking and logical chorographic expression, in dealing with regional phenomena and world problems.

Acknowledgments

In outlining the classification of the natural and cultural forms of the environment, the writer drew liberally from various sources. He is particularly indebted to White and Renner for their *Outline of Geographical Elements*[1] from which especially many of the human factors were selected. The outline of landforms is essen-

[1] White, C. Langdon and Renner, G. T., 1936. *Geography—An Introduction to Human Ecology*. D. Appleton-Century Co., New York.

tially after Lobeck.[2] Many of the hydrographic forms are after Tarr and Von Engeln.[3] Most of the maps used to illustrate the various classes and distribution of forms of the physical landscape were taken from Finch and Trewartha's text.[4] The climatic classification consists of a taxonomic key adapted by the writer from the Köppen System.[5]

To his geography seniors the writer is grateful for the inspiration which comes from this student co-operative adventure seeking to promote a better geographic understanding of world events, and of the science of geography itself.

[2] Lobeck, A. K., 1939. *Geomorphology*. McGraw-Hill Book Co., New York.

[3] Tarr, R. S., and Von Engeln, O. D., 1930. *New Physical Geography*. The Macmillan Co., New York.

[4] Finch, V. C., and Trewartha, G. T., 1936. *Elements of Geography*. McGraw-Hill Book Co., New York.

[5] Meyer, A. H., 1938. *An American Adaptation of the Köppen Classification of Climates*. Papers of the Michigan Academy of Science, Arts, and Letters, Vol. 23, Ann Arbor, Michigan.

FIELD WORK IN SECONDARY SCHOOL GEOGRAPHY

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Field work in secondary school geography may be either a low form of "busy work" or a vital educational process. If it is to be the latter, it must be carefully planned and executed, then followed up by clear-cut classroom exercises designated to permit the orientation of the individual excursions to the main stream of the geography course.

To secure background for a study of the American Manufacturing Belt, the geography classes of Washington High School recently made a field trip to Akron, Ohio. This city leads among the cities of the world in the manufacture of automobile tires (60 per cent of American automobile tires are made in Akron).

READING AN IDEA FROM THE LANDSCAPE

Preparatory to the trip, care was taken to have students see Akron's location on political-physical maps of the United States, especially with reference to major lines of transport, and to the stream pattern.

In order to secure the maximum benefit from the trip, each student was supplied with a sheet of problems relating to the landscape between Massillon, Ohio, and Akron. Among the problems was one relating to the most common type of farm in the area intervening between the two cities. A footnote on the problem sheet advised the student that the dairy farm is typical of the region now, whereas the wheat farm was dominant seventy years ago. The student was asked to read one reason for the change from the landscape. Geography and American history are taught concurrently in the senior year at Washington High School. Combining information from both subjects, many students were able to arrive at the solution of the problem when they recalled that the railroad reached the present large-scale wheat farming area in the level land west of Chicago only about seventy years ago. Thus they were able to see that the rolling topography of northeastern Ohio was unable to compete with the newly opened level wheat lands. Upon our return to the classroom, we examined the United States census and discovered further that seventy years ago the towns of the present

manufacturing area of northeastern Ohio were quite small, and so would have occasioned only small demand for fresh farm produce. Dairy farming has supplanted wheat farming as a concomitant of the industrialization of the area and the consequent urban development, plus the factor of surface which could be read from the landscape.

SITES OF AKRON AIRPORT AND RUBBER PLANT

Since the route to the rubber plant passed by the Akron airport, and since all forms of transport, no less than the agriculture, of the area are components of a study of manufacturing, the problem sheet called for some observations here. These related to (1) the orientation of a large zeppelin hangar, which is parallel to the direction of the prevailing winds; (2) the natural factors favoring the development of an airport here (the port, developed on a large area of nearly level land, is flanked on its east and west sides by long ridges which help shelter it from strong winds); and (3) the reason for the placement of the airport office at the north end of the port (this being the point of contact with the street pattern of the city, and with a focus of state highways).

The site of the rubber plant was the next item on the sheet of problems. It was located near the fringe of the urban agglomeration. Indeed, corn fields bordered the plant site at several points. The plant was originally developed at some distance from the city limits, but the phenomenal growth of the tire industry caused the gap to close rapidly, and second-class residence areas now border the plant site on three sides.

LEARNING THE PATTERN OF THE RUBBER PLANT

Visiting the plant's interior, we come to our main objective. This point in a field trip is frequently a parting of the ways—a pitfall to real, effective field geography. An industrial process is usually not a valuable source of geographic information. We spent as little time as possible reviewing the tiremaking process. Rather, we devoted our efforts to securing (by a planned questioning of the guides and plant officials) a composite mental picture of the geographic pattern of the plant.

We asked about the sources of major raw materials. Rubber comes to the plant from the far-off tropical Orient, where the rubber company owns plantations. Brazil ceased to be the main source of

rubber as early as 1915, when the demand for rubber had outgrown Brazilian supplies, and the industry migrated to Malaya, Java, and Sumatra. Here a dense agricultural population, experienced in plantation operation, was at that very time seeking a commercial crop to replace blighted coffee and market-glutted tobacco.

Cotton fabric, we learned to our surprise, is woven from cotton produced not in the American Cotton Belt, but in the Nile Valley, the Peruvian Coastal Desert, and the Imperial Valley of southwestern United States. This is because tire fabric must be made of longer-staple cotton than our southeastern states can produce. Each area producing long-staple cotton, we learned upon our return to the classroom, is characterized by a growing season longer than that of the American Cotton Belt, and by almost continuous sunshine, water being supplied by irrigation.

National Defense in Rubber

We asked what provisions the rubber company was making to prepare for the threatened curtailment of rubber supplies due to the Oriental military situation. We were told that a large amount of crude rubber had been stored, and that synthetic rubber research had gone forward so rapidly that our country would soon need fear no crisis as a result of a sharp reduction in imports of crude rubber if such reduction should occur.

The Factor of Location

Often a single question asked of a plant manager will open the gates to much geographic knowledge. We asked what factors help determine the location of rubber plants. It was pointed out to us that Akron is located in the city belt of northeastern United States, and less than two hundred miles from Detroit—the center of the automobile industry. The origin of the rubber industry in Akron, however, was accidental, the man owning the rubber patents having made his home here. But among natural factors the supply of fresh water is most important in determining rubber plant location. This is because the tire industry ranks with steel as a heavy user of water. Here the Akron rubber industry finds its greatest problem. The city of Akron being situated at a point near the watershed between the St. Lawrence and Mississippi drainage systems, rubber plants here find no large water supply available from local streams. Several large artificial reservoirs have accordingly been developed

north of the city (on the St. Lawrence side of the watershed) as the industry has expanded. One of these reservoirs is even now under construction. Altho northeastern Ohio is characterized by glacial gravel deposits filling pre-glacial valleys, providing excellent underground water-storage basins, Akron is quite unable to satisfy its needs for industrial water from this source.

Summarizing Results

As a summary exercise in the classroom, major raw materials were traced from their points of origin to the plant. Even the industry's source of power was located in the coalfields of southeastern Ohio. Rubber from Asia normally follows the Suez and North Atlantic sea routes to New York. Cotton from Egypt also follows this sea road. Cotton from Peru passes thru the Panama Canal, and reaches New England textile plants via the North America-South America sea route. Cotton from Arizona and California goes by rail to the textile plants of the Carolina Piedmont. Cotton fabric and crude rubber are brought to Akron by rail. Finished tires are distributed to points within a few hundred miles radius by truck, and to more distant points by rail. All this information was gleaned from the personnel of the rubber plant.

Numerous questions were raised by the students that more properly belong to economics or sociology. As far as possible these questions were answered. But the results obtained in the direction of achieving geographic objectives were easily seen and measured. The railway pattern of eastern United States, the seaway pattern of the world, the function of far-away climates and groups of experienced peoples all were passed in review as a result of this brief inquiry into the functioning of a single establishment in the Manufacturing Belt of America. Visits to other establishments will follow. First-hand geography not only sharpens the eyes of young travelers, it adds purpose and color to the classroom activities of the geography course. It makes otherwise drab sources of factual information gateways to broad concepts of geographic patterns and to the larger understandings of geography. In the field, geography is permitted to bring to bear its maximum force as a vital educational tool.

EDITORIAL NOTES AND NEWS

Petroleum is a vital factor in modern war, and the present war has disrupted normal production and markets. Fully two-thirds of the world's production is from the Western Hemisphere, and much of its normal foreign market has been lost necessitating readjustments. Usually Canada buys nearly three-fourths of its imports from the United States, and still purchases approximately 80,000 to 90,000 barrels of crude oil daily. But recently unfavorable exchange rates, need of conserving its purchasing power in United States dollars, and more favorable exchange rates in South America have resulted in large Canadian imports from Venezuela and Colombia. During the winter months this oil is delivered by ship to a point near Halifax and during the summer months it passes up the St. Lawrence. An all-year route has recently been opened thru the use of American pipe lines. Ships from Venezuela deliver the oil to Marcus Hook, Pennsylvania, on the Delaware River. From this port 10,000 barrels will be delivered daily to refineries at Sarnia, Ontario, by way of pipe lines across Pennsylvania, Ohio, and southeastern Michigan. This is the first time that any large amount of foreign petroleum has been shipped thru pipe lines of this country. Fully 70 per cent of the refinery capacity of Canada is in the East, chiefly in southern Ontario, and favorably located for importation of foreign crude petroleum, and to local markets.

According to a release from the Bureau of Mines, shipments of manganese ore (36 per cent or more manganese) from domestic mines are estimated at 40,000 long tons in 1940. Altho thirteen states shared in the production, Arkansas, Montana, and Tennessee accounted for about 80 per cent of the total. Shipments of domestic supplies of ferruginous manganese ore (10 to 35 per cent) in 1940 are estimated at 306,000 long tons. Fourteen states are listed in this production, the New Mexico and Minnesota contributed 90 per cent of it. Shipments of manganiferous ores (5 to 10 per cent manganese) from domestic mines were 984,000 long tons of which Minnesota supplied 98 per cent. All of these are large increases over 1939. General imports of manganese ore (35 per cent or more manganese) in 1940 were about a million and a quarter long tons, the leading producers being U.S.S.R., Gold Coast, British India, Union of South Africa, Brazil, and Cuba.

The Northeastern Ohio Council of Geography Teachers held its spring meeting at Youngstown, Ohio, March 8. The theme dealt with changes in Europe with papers presented by Miss Maude Hobson, Youngstown, Ohio; Mrs. Bess Williams, Euclid, Ohio; Mr. W. M. Gregory, Cleveland, Ohio; Mr. W. R. Smith, Youngstown, Ohio; and Miss Edna Eisen, Kent State University. The field trip in and about Youngstown had to be cancelled due to inclement weather, and as a substitute an illustrated lecture was given by Emmett Conway, Forester of Mill Creek Park.

Brahman cattle (the humped cattle of India) crossbred with Aberdeen Angus and the Africander (from South Africa) are producing a new beef breed adapted to the hot and humid Gulf Coast area. These animals apparently suffer little from heat.

It is reported that the first delivery of natural ice to an American home was made in 1802, altho in 1799 a cargo of ice had been sent from New York to New Orleans. By 1805 a large ice house had been built on the Hudson and ice was shipped to the West

Indies to help alleviate the misery of a yellow fever epidemic. What modern refrigeration has done to the ice harvest is reflected by the fact that Wisconsin's annual ice harvest is now but a fourth of its former amount.

According to a preliminary report from the Sixteenth Decennial Census, the population of Alaska numbered 72,524, an increase of 22.3 per cent over that of 1929.

By wearing a mask or mouthpiece attached to an oxygen tank in his plane, a pilot can take a plane into the sub-stratosphere, 35,000 to 40,000 feet above sea level. As a precaution against aeroembolism, or air bends as it is called, a condition in which nitrogen bubbles form in the blood and which may lead to unconsciousness, the pilots prepare for the ascent by breathing pure oxygen. By wearing a mask or mouthpiece attached to an oxygen tank in his plane, the pilot can attain these high altitude flights without discomfort. Only recently have pilots been able to make parachute descents from the sub-stratosphere in case the planes were disabled, since oxygen starvation occurs during the fifteen minute interval required to reach oxygen-sustaining levels. So now the pilot carries an emergency tank of oxygen in a special trouser leg pocket. This tank has 28 quarts of oxygen sufficient for a safe descent. Transfer from the plane tank to the emergency tank mouthpiece must be made at once as even a 30 second interval without oxygen might lead to death. Part of the research which led to the equipment and techniques which enable safe descents from the sub-stratosphere was carried on at the Mayo Clinic where the same rarified atmosphere as prevails at sub-stratosphere levels was duplicated in a low pressure air chamber in which the scientists actually duplicated the performance of a pilot bailing out of what in the past had been a deadly altitude.

Chestnut and quebracho are the sources of most of the important tanning materials used in the United States, the two making up more than 80 per cent of all vegetable tannins used Consumption of each is about equal in amount. Since maturity of quebracho trees is variously estimated to require between forty and a hundred years, some fears are expressed at possible exhaustion of the present known stands. No reforestation of quebracho has been undertaken, but it is possible that stands are in existence which have not yet been discovered. At present over half of our vegetable tanning materials are of foreign origin, and more than half of these come from Latin America. Others come from a world-wide distribution. Fortunately, particular results in leather tanning are usually obtained from a blending of a variety of tannins. Thus it is probable that no crop failure due to storm or pest in one part of the world and no blockade in war times can ever prevent the United States from getting adequate supplies.

Within a relatively short span of years, the manufacture of vitamins has become an industry of vast proportions. Already annual sales are said to total $100,000,000. They are not only sold for human use but for plant and animal life. Of recent interest is the project of a Minneapolis manufacturer who is offering his employees daily a capsule containing vitamins reputed to build up resistance to colds so prevalent in Minnesota's winters. Participation in the scheme is not compulsory. Colds have often laid off enough men to seriously handicap production. The company is willing to spend several hundred dollars to find out if the daily use of vitamins will reduce colds. Another interesting slant on vitamin significance is reported by a western scientist who claims to have taken away the complex "B" type of vitamins from the diet of silver foxes

and thereby changed their fur to that of the platinum fox. The latter furs have come largely from Norway so their price is now prohibitive. The vitamin B diet-deficient animals have a fur that is unfortunately not durable. So the quest is on for something in the diet that will produce durability and at the same time not interfere with the beauty of the platinum-toned fur. Thus, a new industry with far-reaching ramifications in health and vitality programs, and in new developments in plant and animal life is here in a land where some have been so bold as to say there are no new frontiers! Vitamins are but one illustration of our new chemical frontiers.

You may have to go without spinach next year since spinach seed is reported to be scarce. Most of it came in the past from the Netherlands.

The National Park Service of the United States Department of the Interior is continuing its educational policy of issuing special bulletins to acquaint the public with the principal historic and scientific aspects of our Parks and Monuments. Some of the 1940 publications of special interest to Social Studies classes are entitled as follows: Fort McHenry, National Monument and Historic Shrine, Maryland; Death Valley, National Monument, California; and Colonial National Historical Park, Virginia.

According to the Petroleum Economics Division, the production of natural gas in 1939 totaled 2,476,756,000 cubic feet, an increase of three per cent over the peak of 1937. Consumption totaled 2,473,765,000,000 cubic feet, an increase in all major classes of consumption except fuel at petroleum refineries. Texas, California, Louisiana, Oklahoma, and West Virginia led in production. Exports to Mexico almost doubled, but those to Canada diminished.

The average fleece of sheep sheared in the United States in 1940 weighed 8.03 pounds, as compared with 7.96 pounds in 1939, and 2 pounds in 1840. The heaviest fleeces in 1940 were on Wyoming sheep, the average weight being 9.7 pounds, while those of Florida sheep averaged 3.1 pounds. However, at the Northern Florida State Agricultural Experiment Station, ewes have had as high as 15 pound fleeces, and the best rams, 25 pound fleeces.

Since the completion last summer of the 205 mile highway from Posadas, Argentina, to Iguassu Falls, it is possible to motor all the way from Buenos Aires to the Falls.

The "Library Letter" has resumed publication at the Newark Public Library. The first is one of a series of five issues on "International America" and is devoted to Latin America. It lists more than 80 books for children of primary and elementary grades, as well as a number of teaching references, pamphlets and periodicals; also an almanac of South American holidays as a suggestion for exercises and programs. Forthcoming issues sound promising. The cost is nominal.

Teachers planning programs for Pan American Day, April 14, may obtain material appropriate to the occasion, free or at nominal cost, from the Pan American Union, Washington, D.C.

GEOGRAPHICAL PUBLICATIONS

Charles N. Elliott. **Conservation of American Resources,** 672 pages. Turner E. Smith and Company, Atlanta, Georgia, 1940.

This is an excellent high school conservation text or supplementary reader and perhaps the best yet to be written. It contains twelve units: Steps Toward Conservation; Game Birds; Game Animals; Fish; Forests; Nature's Masterpieces; Land; Water; Minerals; Animals and Plant Life; Landscapes; and Planned Conservation.

The following features about the book will appeal to high school students: excellent and varied pictures including personal photographs; excerpts of speeches and lectures by promoters of the conservation movement; Conservation Codes; interesting anecdotes about exploitation and restoration of resources; suggestions for self development and activity; and the optimistic challenging treatment of the conservation problem as a whole. Mr. Elliott not only understands conservation but he also knows how to interest and stimulate youth into action for conservation.

Teachers will appreciate the suggestions for study; the problem method of treatment; and functional subject matter, and the appendix. The latter contains definitions of conservation words, readings in conservation and sources of information such as conservation organizations, periodicals, and government agencies.

This book should be in every junior and senior high school library and should be seriously considered for public libraries.

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Centenary celebration, the Wilkes Exploring Expedition of the United States Navy, 1838-1842 and symposium of American Polar Exploration.—(Proceedings of the American Philosophical Society, Vol. 82, No. 5, June, 1940. $2.50.)

This volume is a replete, yet concise account of American polar exploration and should prove to be a valuable reference for anyone interested in polar geography. The various chapters are written by specialists in this field of study, by trained men in the governmental agencies, or by executives of the scientific societies that have assisted with the work. Included is a possible ten-year program of Arctic study which is proposed by Vilhjalmur Stefansson. He suggests that ten to twenty observation groups of from three to five men each be placed upon the drift flows of the Arctic and that they use a method of living and study which is based upon and developed from the procedure used by the Canadian Arctic Expedition of 1913-1918 and the Soviet Expedition of 1937-1938.

There is great detail concerning the Wilkes Expedition whose primary interest was to aid commerce and navigation but an important secondary aim was "to extend the bounds of science and promote knowledge." The immediate reason for this expedition was directly associated with our interest in the whaling industry. Whalers had been penetrating deep into Antarctic regions and had touched upon new and uncharted islands, some of which had not been reported as such a procedure would have disclosed the new fishing grounds to their competitors. Certainly this volume will serve as a notable memorial to a pioneer achievement in the field of geographic exploration.

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